

PATENT SPECIFICATION



Application Date : Dec. 1, 1919. No. 29,870 / 19.

159,333

Complete Left : Aug. 21, 1920.

Complete Accepted : Mar. 1, 1921.

PROVISIONAL SPECIFICATION.

Improvements in Laminated Springs.

We, BOULTBEE BROOKS, Director, and J. B. BROOKS and COMPANY LIMITED, both of Criterion Works, Great Charles Street, Birmingham, Manufacturers, do hereby declare the nature of this invention to be as follows:—

This invention relates to laminated springs for motor vehicles and other purposes, and has for its object to provide an improved and more efficient construction of such springs.

The invention consists essentially in dividing each of the laminations of the spring longitudinally in a vertical plane or in the direction of the width of the spring. Each of the laminations may, for example, be made up of a number of spring wires of any suitable section and arranged side by side, one row or series of wires being, if desired, superimposed upon another; or each lamination may be composed of a number of spring metal strips arranged in a similar manner. A more resilient spring having longer life is thus obtained.

Thus, according to one arrangement, as described in connection with a quarter-elliptic leaf spring, each of the laminations of the latter is composed of spring wires arranged longitudinally side by side. The wires are secured together at one end of the lamination by a plate, formed with a series of holes or sockets into which the ends of the wires are inserted, the said ends being then sweated into the plate; or they may be secured together by a corrugated metal strip, or in any other suitable manner; or, if desired, the two outer wires only may be secured to the

plate the ends of the other wires of the lamination being free to turn within the plate so as to allow for any torsional strains to which the spring may be subjected. The opposite ends of the wires of the whole of the laminations of the spring are secured to a single block, the latter being provided with several superimposed rows of holes, according to the number of laminations, the ends of the wires of each lamination being inserted within the corresponding row of holes and sweated or otherwise secured to the block, the ends of the wires of the whole of the laminations are thus rigidly fixed to the latter.

Instead of each lamination of the spring consisting of a single row of wires arranged side by side, as above described, it may be composed of a number of superimposed rows of wires, the wires of each row being preferably staggered with respect to the wires of the adjacent row, so as to fit within the grooves formed by the wires of the said adjacent row. A spring reinforcing plate may be fitted, if desired, upon the upper row of wires of each lamination.

The wires forming the laminations may be of a square section and arranged with their one diagonal in alignment, each row of wires of the lamination being staggered with respect to the wires of the adjacent row, so that the wires of the one row nest within the spaces formed by the wires of the adjacent row.

Or each of the laminations may be formed of stranded wires; or it may be formed of a number of superimposed rows of wires of a small diameter arranged between two wires of a larger diameter

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arranged adjacent to the ends of the said rows.

The wires of each lamination may be arranged in the form of tubes or circular concentric layers fitting one within the other, and secured together by corrugated or other metal band, or in any other suitable manner.

Instead of wires being employed to form

the laminations, spring metal strips may be used. 10

Dated this 29th day of November, 1919.

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COMPLETE SPECIFICATION.

Improvements in Laminated Springs.

We, BOULTBEE BROOKS, Director, and J. B. BROOKS and COMPANY LIMITED, both of Criterion Works, Great Charles Street, Birmingham, Manufacturers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to springs for motor vehicles and other purposes and of that type comprising a number of superimposed laminations of varying lengths. The object of the invention is to provide an improved and more efficient construction of such springs.

The invention consists essentially in dividing each of the laminations of the spring longitudinally. Each of the laminations may, for example, be made up of a number of spring wires of any suitable section and arranged side by side, one row or series of wires being, if desired, superimposed upon another; or each lamination may be composed of a number of spring metal strips arranged in a similar manner. A more resilient spring having a longer life is thus obtained.

It has been proposed to employ springs composed of a series of strands or wires arranged side by side, or one upon the other, but such springs have not comprised a series of laminations of varying length, whilst in these known constructions the ends of all the wires or strands forming the spring have been secured together.

Figure 1 of the accompanying drawings represents a side elevation of a semi-elliptic spring constructed in accordance with one form of the invention and in which each of the laminations is composed of a series of circular sectioned spring wires.

Figure 2 is a top side plan of same.

Figure 3 is a cross-section on the line x , Figure 1.

Figure 4 is a section on the line x^1 , Figure 1. 65

Figure 5 shows a section on the line x^2 , Figure 1.

Figure 6 represents a section through a modified construction of spring in which the wires forming the laminations are separated and held in position by distance plates. 70

Figure 7 is a cross-section on the line x^3 Figure 6, upon a larger scale.

Figure 8 shows a further arrangement in which U-shaped members are employed to hold the wires forming laminations in position. 75

Figure 9 is a section on the line x^4 Figure 8, upon a larger scale. 80

Figure 10 shows a cross-section through a modified construction of spring in which the laminations consist of a series of flat metal bars or strips.

Figure 11 represents, in cross-section, a further arrangement in which a spring reinforcing plate is arranged above the top lamination. 85

Figure 12 shows an arrangement in which the wires or rods are held in position by corrugated metal bands. 90

Figure 13 shows a cross-section through a single lamination constructed in accordance with a further form of the invention.

Figure 14 and 15 represent cross-sections through a further construction of spring which may be employed. 95

Figure 16 is a perspective view showing a still further construction of spring.

Figure 17 shows a part longitudinal section through a modified arrangement in which the wires pass through perforated distance plates. 100

Figure 18 is a section on the line x^5 Figure 17. 105

The same reference numerals indicate corresponding parts in each of the figures.

Referring to Figures 1 to 5 of the drawings, each of the laminations of the spring

are composed of a series of spring wires or rods 1 arranged in the same plane and separated laterally from one another, each lamination being also separated vertically.

- 5 The said wires or rods are passed through transverse holes in a metal block 2 arranged at the centre of the spring, and are rigidly secured to the block by sweating, or in any other suitable manner, the
10 said block 2 serving to hold the wires or rods of the laminations in position, at the required distance apart. The extremities of the wires of each lamination are secured within transverse holes in separate metal
15 plates 3. If desired, perforated plates 3 may be employed of the construction shown in Figures 6 and 7, for securing together the ends of the wires of each lamination, the wires of the upper lamination
20 also passing through the plates, so that the latter serve to vertically separate the laminations; or, as shown in Figures 8 and 9, the extremities of the wires of each lamination may be passed through holes
25 in the cross bar 3 of U-sectioned members having upwardly extending arms 4 which serve to prevent lateral displacement of the upper laminations.

- 30 Instead of the laminations being composed of wires or rods of a circular section, they may be made up of flat metal strips 1 as shown in Figure 10.

- 35 As shown in Figure 11 a spring reinforcing plate 5 may be fitted above the top lamination of the spring; whilst if desired, the whole of the wires 1 of the laminations may be encircled by corrugated bands 3, as in Figure 12.

- 40 Figure 13 shows a view of a single lamination which is made up of a number of superimposed rows of wires 1 of a small diameter arranged between two wires 6 of a larger diameter.

- 45 As shown in Figure 14, the wires 1 forming the laminations may be of a square section and arranged with their one diagonal in alignment, each row of wires of the lamination being staggered with respect to the wires of the adjacent
50 row, so that the wires of the one row nest within the spaces formed by the wires of the adjacent row. Or each of the laminations may be formed of stranded wires 1 as shown in Figure 15, the said wires 1
55 being arranged as shown, or in any other suitable manner.

Referring to Figure 16, the wires or rods 1 of each lamination may be arranged

in the form of tubes or circular concentric layers fitting one around the other as shown, the ends of each lamination being encircled by metal bands 3; or instead of bands being employed the wires or rods 1 may be passed through perforated metal plates 3 the extremities of the said wires or rods being preferably rivetted over as shown in Figures 17 and 18, the said plates 3 serving to separate the wires and hold them in position. This construction is particularly applicable to torsion
60
65
70 springs.

Each lamination of the spring may be composed of a series of superimposed wires or rods, instead of a single row, the wires of each row being preferably staggered with respect to the wires of the adjacent
75 row.

Instead of the extremities of the whole of the wires or rods of each lamination being secured together, by a band or plate, the ends of the two outer wires only may be secured, the ends of the other wires of each lamination being free to turn to allow for any torsional strain to which the spring may be subjected.
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85

The extremities of the wires or rods may be secured together by any suitable means.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—
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1. In springs of the type referred to, for motor vehicles and other purposes; forming each of the laminations of the spring of a series of spring wires or bars arranged side by side, substantially as described.
95

2. In springs of the type referred to, for motor vehicles and other purposes; forming each of the laminations of the spring of a number of superimposed rows of spring wires or bars arranged side by side, substantially as described.
100

3. The various constructions of laminated springs substantially as herein described and set forth by the accompanying drawings.
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Dated the 20th day of August, 1920.

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Agent for Applicants.
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Fig.1.

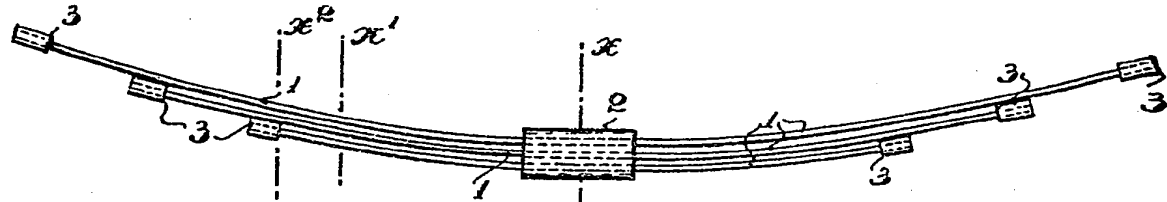


Fig.2.



Fig.3.

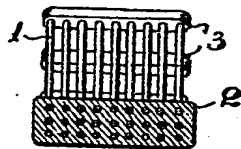


Fig.4.

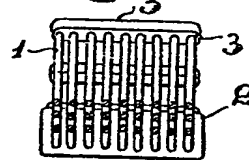


Fig.5.

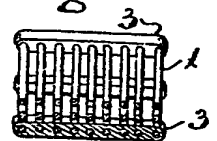


Fig.6.

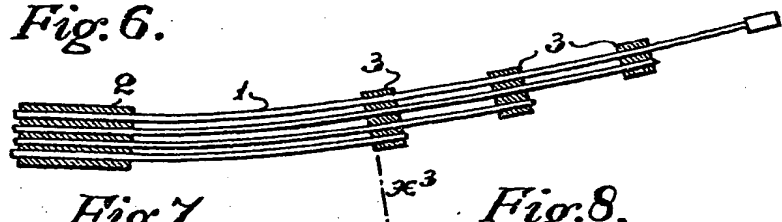


Fig.7.

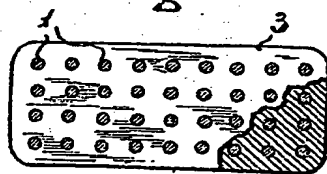


Fig.8.

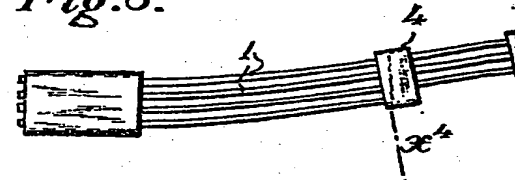


Fig.9.

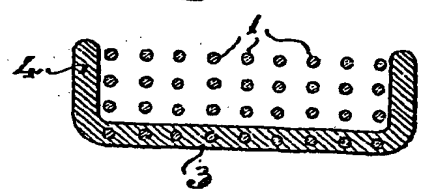


Fig.18.

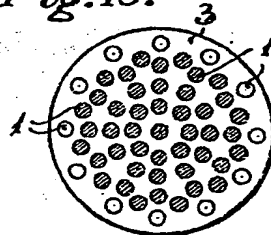


Fig. 10.

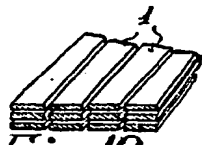


Fig. 11.

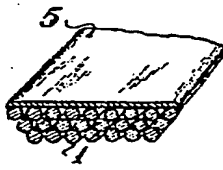


Fig. 12.



Fig. 13.

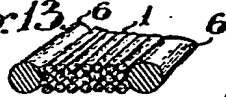


Fig. 14.



Fig. 15.



Fig. 16.

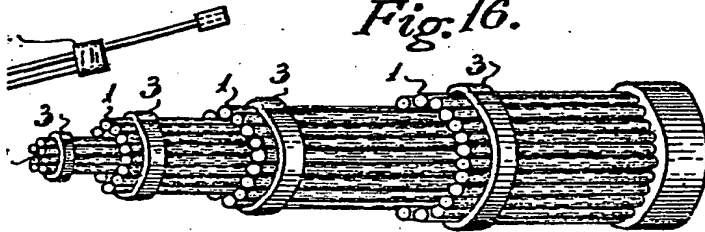


Fig. 17.

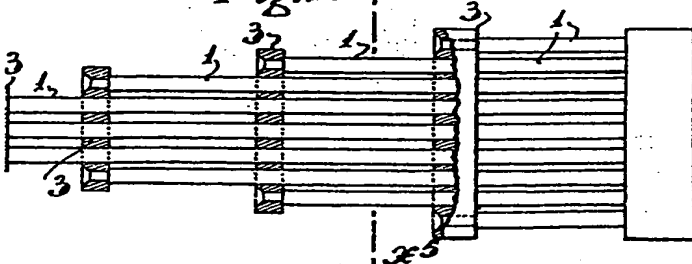


Fig. 1.

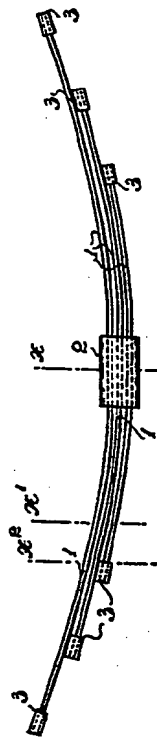


Fig. 2.

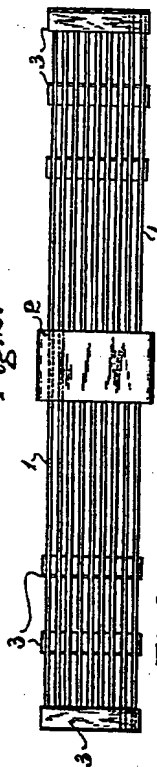


Fig. 3.

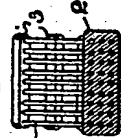


Fig. 4.



Fig. 5.

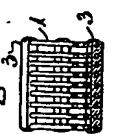


Fig. 10.



Fig. 11.

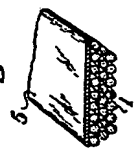


Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.



Fig. 6.



Fig. 8.



Fig. 16.

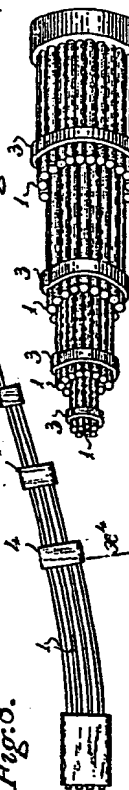


Fig. 9.

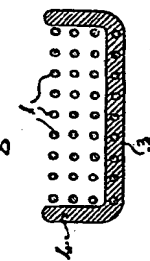


Fig. 17.

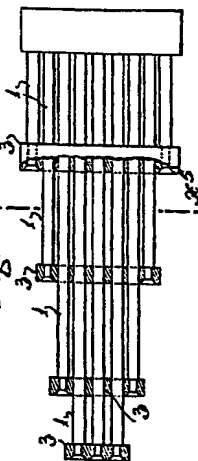


Fig. 18.

